


# In Vitro Fertilization and Vasa Previa: A Report of Two Cases

## *Fertilização in vitro e vasa previa: relato de dois casos*

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### Abstract


Vasa previa (VP) is a dangerous obstetric condition associated with perinatal mortality and morbidity. In vitro fertilization (IVF) is a risk factor for VP due to the high incidence of abnormal placentation. The diagnosis should be made prenatally, because fetal mortality can be extremely high. We report two cases to demonstrate the accuracy of transvaginal ultrasound in the prenatal diagnosis of VP. A 40-year-old primiparous Caucasian woman with IVF pregnancy was diagnosed with VP at 29 weeks of gestation and was hospitalized for observation at 31 weeks of gestation. She delivered a male newborn weighing 2,380 g, with an Apgar score of 10 at 5 minutes, by elective cesarean section at 34 weeks + 4 days of gestation, without complications. A 36-year-old primiparous Caucasian woman with IVF pregnancy was diagnosed with placenta previa, bilobed placenta increta and VP. The cord insertion was velamentous. She was hospitalized for observation at 26 weeks of gestation. She delivered a female newborn weighing 2,140 g, with an Apgar score of 9 at 5 minutes, by emergency cesarean section at 33 weeks + 4 days of gestation due to vaginal bleeding. The prenatal diagnosis of VP was associated with a favorable outcome in the two cases, supporting previous observations that IVF is a risk factor for VP and that all IVF pregnancies should be screened by transvaginal ultrasound.

### Keywords

- ▶ vasa previa
- ▶ in vitro fertilization
- ▶ placenta previa

### Resumo

Vasa previa (VP) é uma condição obstétrica perigosa associada a mortalidade e morbidade perinatais. Fertilização in vitro (FIV) é um fator de risco para VP devido à alta incidência de placentação anormal. O diagnóstico deve ser realizado no período

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pré-natal, pois a possibilidade de mortalidade fetal é extremamente elevada. Relatamos dois casos para demonstrar a acurácia da ultrassonografia transvaginal no diagnóstico pré-natal de VP. Mulher caucasiana, primigesta, de 40 anos, submetida a FIV, foi diagnosticada com VP na 29ª semana de gestação e hospitalizada para observação na 31ª semana de gestação. A paciente foi submetida à cesariana eletiva com 34 semanas e 4 dias, sem complicações, com recém-nascido do sexo masculino, pesando 2.380 g, e com Apgar de 10 no 5º minuto. Mulher caucasiana, primigesta, de 36 anos, submetida a FIV, foi diagnosticada com placenta prévia, placenta bilobada, acretismo placentário e VP. Cordão umbilical com inserção velamentosa. A paciente foi hospitalizada para observação na 26ª semana de gestação. Foi submetida à cesariana de emergência com 33 semanas e 4 dias por sangramento vaginal. O recém nascido do sexo feminino pesou 2.140 g, com Apgar de 9 no 5º minuto. O diagnóstico de VP no período pré-natal associou-se a um desfecho favorável nos dois casos, corroborando observações anteriores de que a FIV é um fator de risco para VP e de que todas as gestações por FIV deveriam ser avaliadas por ultrassonografia transvaginal.

### Palavras-chave

- ▶ vasa previa
- ▶ fertilização in vitro
- ▶ placenta prévia

## Background

Vasa previa (VP) is a dangerous obstetric condition associated with perinatal mortality and morbidity, with an incidence of ~1 per 2,500 deliveries. In vitro fertilization (IVF) is considered a risk factor for VP due to the high incidence of abnormal placentation. Other risk factors include low-lying placenta or placenta previa, bilobed or succenturiate-lobed placenta, and multiple gestations. The diagnosis should be made prenatally, because fetal mortality can be extremely high.

## Case Description

### Case 1

A 40-year-old primiparous Caucasian woman with placenta previa and pregnancy obtained after IVF, without prenatal complications, was diagnosed with VP at 29 weeks of gestation. The ultrasound scan revealed a fetal blood vessel traversing across the cervical os, suggestive of VP (→Figs. 1 and 2). The patient was admitted to the hospital for observation at 31 weeks of gestation and received corticosteroids. Fetal monitoring and

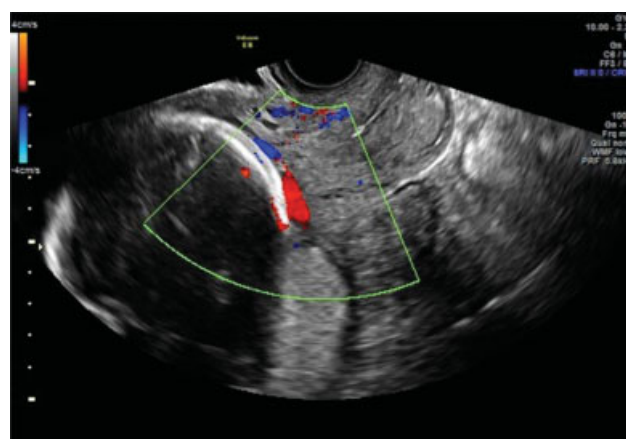
uterine contraction assessment were performed daily. The estimated fetal weight was always at the 50<sup>th</sup> percentile. She delivered a male infant weighing 2,380 g, with an Apgar score of 10 at 5 minutes, by elective cesarean section at 34 weeks + 4 days of gestation without any intraoperative complications. The newborn was referred to the neonatal intensive care unit (ICU) and remained there for 2 days. He received continuous positive airway pressure (CPAP) for 12 hours and progressed well with exclusive breastfeeding.

### Case 2

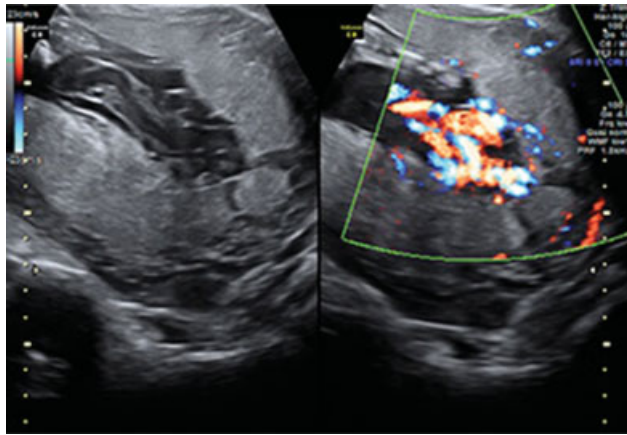
A 36-year-old primiparous Caucasian woman with pregnancy obtained after IVF was diagnosed with placenta previa, bilobed placenta increta and VP at 23 weeks of gestation. The cord insertion was velamentous (→Figs. 3, 4, and 5). She was admitted to the hospital for observation at 26 weeks of gestation and received corticosteroids at 30 weeks of gestation. Oral nifedipine was administered because uterine contractions began at 30 weeks of gestation. The screening test was positive for gestational diabetes mellitus, and the patient was placed on dietary therapy. She delivered a female infant



**Fig. 1** Abdominal ultrasound with high-definition color-flow Doppler imaging showing a fetal blood vessel traversing across the cervical os, suggestive of vasa previa (VP).



**Fig. 2** Transvaginal ultrasound with high-definition color-flow Doppler imaging of vasa previa (VP).



**Fig. 3** High-definition color-flow Doppler imaging showing bilobed placenta previa and velamentous insertion of the umbilical cord.



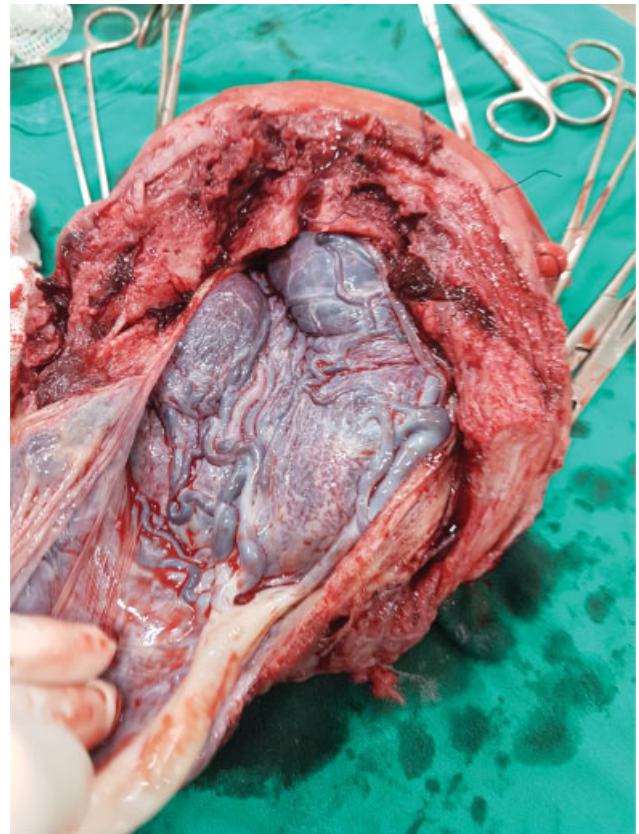
**Fig. 4** Transvaginal ultrasound with high-definition color-flow Doppler imaging of vasa previa (VP).

weighing 2,140 g, with an Apgar score of 9 at 5 minutes, by emergency cesarean section at 33 weeks + 4 days of gestation due to vaginal bleeding. After delivery, a hysterectomy was performed without removing the placenta. The newborn was referred to the neonatal ICU and remained there for 16 days on CPAP. The newborn progressed well with exclusive breastfeeding.

## Discussion

Vasa previa is a complication of pregnancy in which fetal blood vessels lie outside the chorionic plate, in close proximity to the internal cervical os. These vessels may rupture with resultant fetal hemorrhage, exsanguination, or even death.<sup>1</sup>

Approximately 1 per 2,500 deliveries are complicated by VP, and the major risk factors are velamentous cord insertion and succenturiate placental lobe or bilobed placenta.<sup>2,3</sup> Approximately 60% of the women with VP at delivery had a placenta previa or a low-lying placenta identified during the second trimester ultrasound examination.<sup>4</sup> Another risk factor is IVF, which may increase the risk of VP to ~ 1 per 250 deliveries.<sup>5,6</sup>



**Fig. 5** Macroscopic image of the uterus and placenta with a velamentous insertion of the umbilical cord.

The present report supports previous observations that IVF is a risk factor for VP, and transvaginal ultrasound screening for VP appears to be most cost-effective when performed among IVF pregnancies.<sup>7</sup> Jauniaux et al<sup>8</sup> found an incidence of bilobed and succenturiate-lobed placenta of 22% in the IVF group compared with 6% in the control group. Abnormal umbilical cord insertion with normal placental morphology has been associated with IVF. Englert et al<sup>9</sup> found a marginal insertion of the umbilical cord in 15% of the cases, and velamentous insertion in 14% of the cases, more frequently than in the general obstetric population. Romundstad et al<sup>10</sup> reported that the risk of placenta previa was 3-fold higher in pregnancies following assisted fertilization (odds ratio [OR] = 2.9; 95% confidence interval [CI]: 1.4–6.1) compared with naturally conceived pregnancies.

High estradiol concentrations at the time of implantation may impair the endometrial response to trophoblast invasion, leading to abnormal placentation.<sup>11–13</sup> Farhi et al<sup>11</sup> found that a concentration > 10,000 pmol/L led to significantly more complications related to abnormal placentation.

The diagnosis of VP by ultrasound combined with color Doppler imaging can be made during the routine examination of the placenta and of the lower uterine segment, with a detection rate of 93% and a specificity of 99%.<sup>14</sup> Transvaginal ultrasound is extremely important for an accurate diagnosis, and cases that are not diagnosed prenatally are often associated with serious complications, such as fetal death, low Apgar scores, and severe anemia.<sup>14,15</sup>

## Conclusion

Vasa previa is strongly associated with abnormal placentation in the second trimester and can be accurately diagnosed by ultrasound. In the two cases reported here, the prenatal diagnosis of VP was associated with a favorable outcome.

### Conflicts of Interest

The authors have no conflicts of interest to declare.

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